



City LLMs: computational urban planning of tomorrow

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Existing Challenges for current Urban Planners

Maintaining / Adding:

- Housing
- Mobility
- Urban Amenities
- Quality of Life

Problem: Cities are slow!

Case study: Seattle Link Light Rail

- Began planning in 1993, voter approval in 1996
- Construction began in 2000
- First line opened in 2009
- First connection to Bellevue - 2026
- Connection to Tacoma – 2035
- Other cities – 2040s -> ???



Transit Plan Derailed -- Pierce, Snohomish County Voters Say No To \$6.7 Billion Proposal

Mar 15, 1995



Could there exist a mechanism
by which new urban designs and
proposals are quickly
generated?

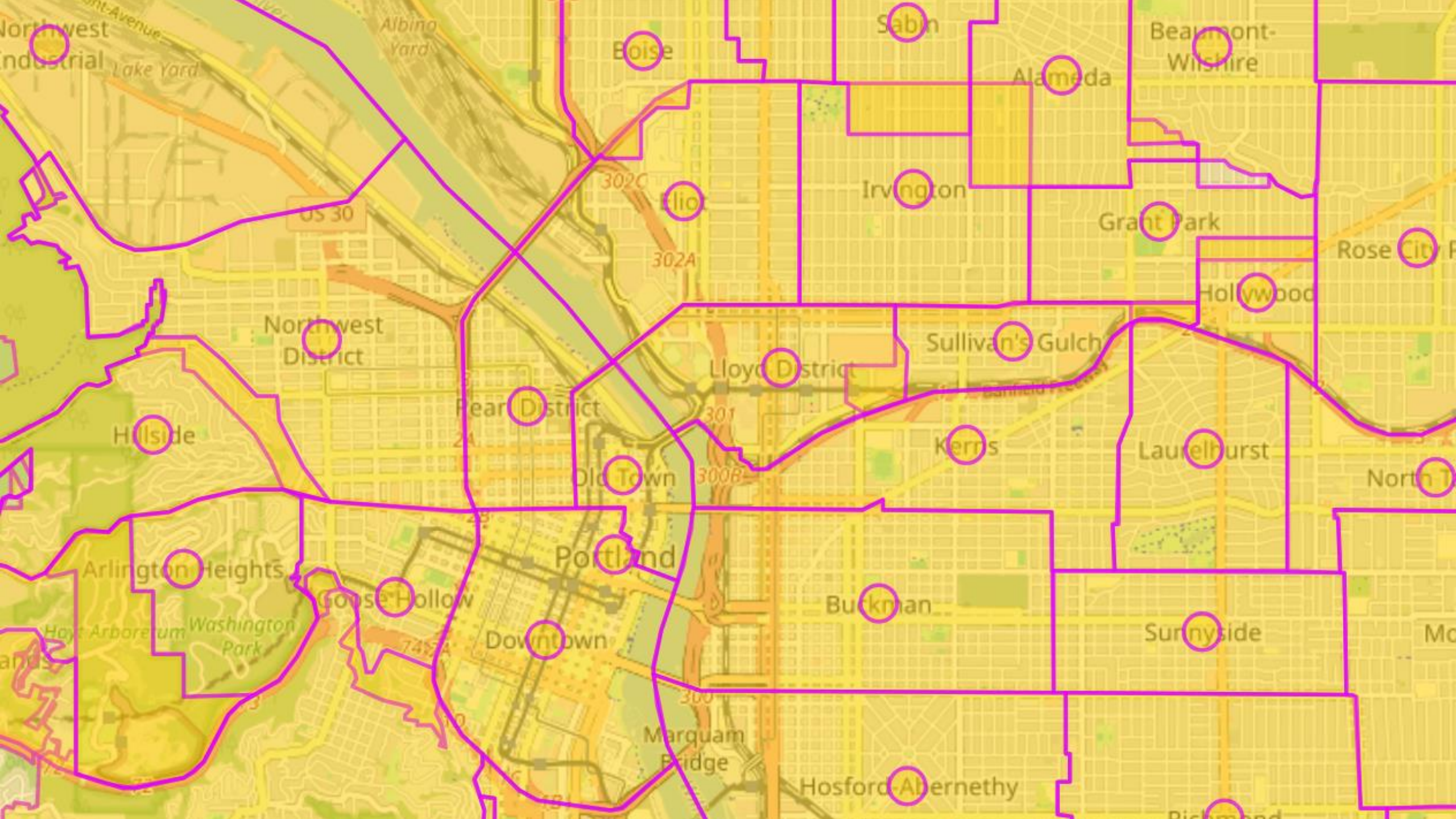
Proof of concept: LLM fine tuning

Large Language Model – predicts the next token in a sequence

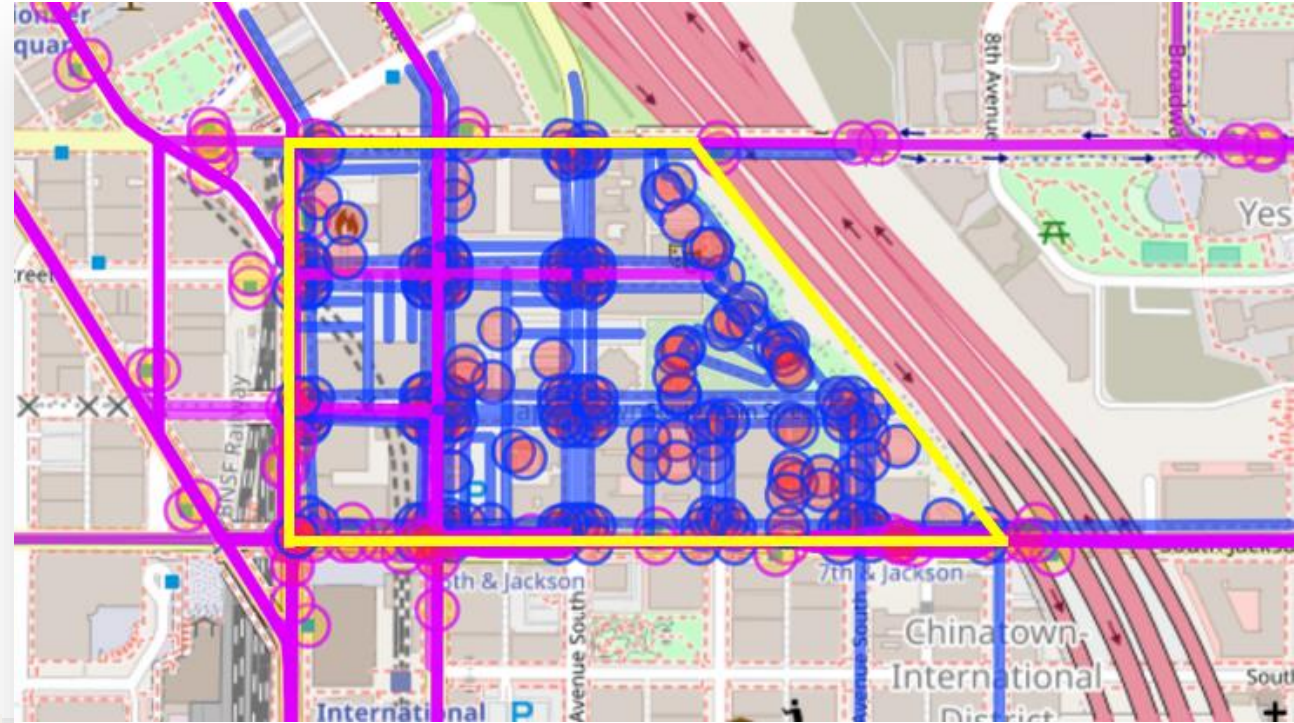
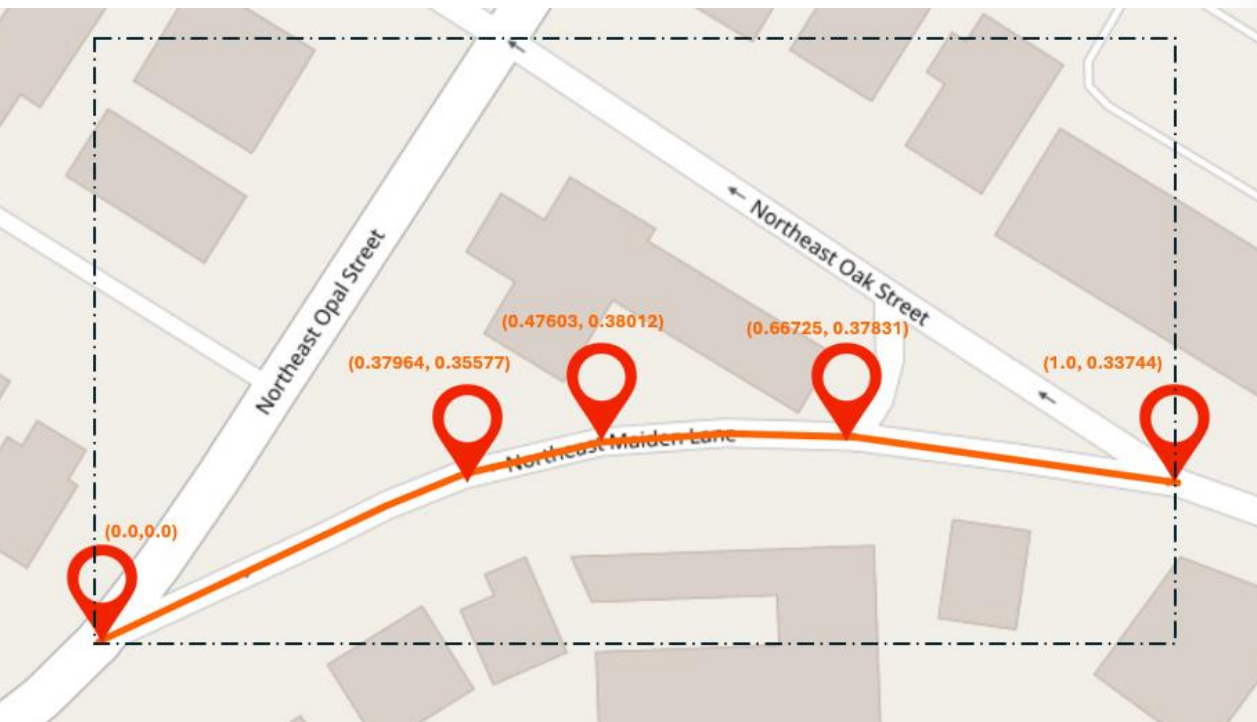
Provide examples of how a certain area can be filled in with real-world neighborhoods

- Break up examples into tokens





GIS Data Representation



Cities require representation in text to fit an LLM

- Neighborhood converted to coordinate points
- Points normalized onto a square coordinate axis
- Examples augmented for normalization

Sketch a polygon, send to backend, OR paste LLM nodes and render them

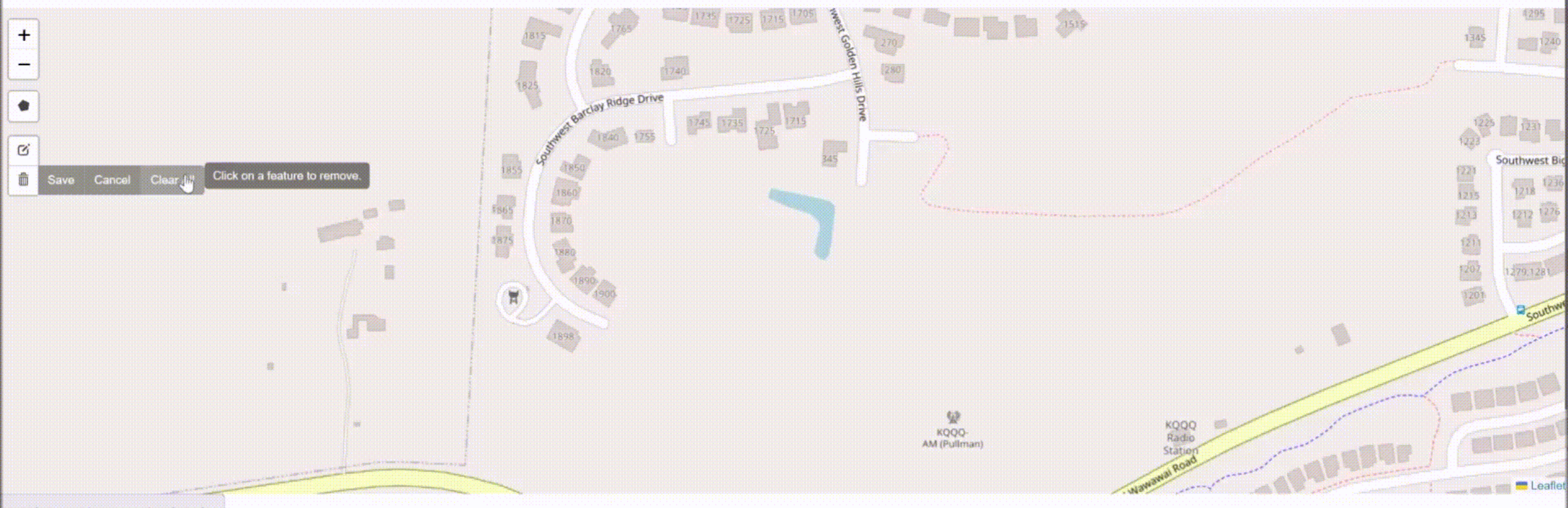
Browse... No file selected.

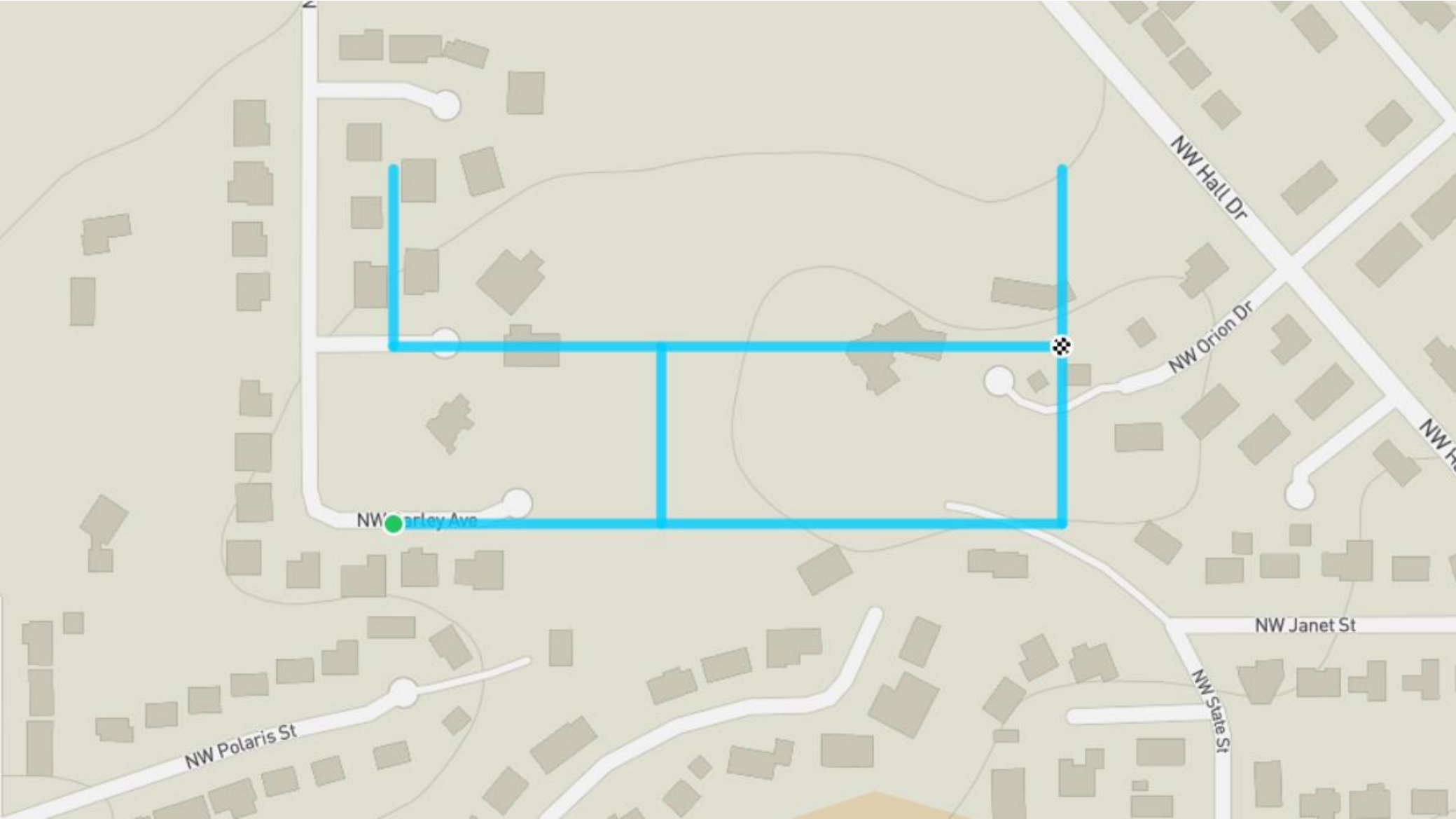
LLM node renderer

min Lat min Lng max Lat max Lng

```
[[{"lat": 0.89134, "lng": 0.58412}, {"lat": 0.86769, "lng": 0.56689}, {"lat": 0.84024, "lng": 0.54445}, {"lat": 0.80954, "lng": 0.51917}, {"lat": 0.78098, "lng": 0.49389}, {"lat": 0.76122, "lng": 0.47885}, {"lat": 0.73288, "lng": 0.45834}, {"lat": 0.71239, "lng": 0.43946}, {"lat": 0.69645, "lng": 0.42366}, {"lat": 0.68229, "lng": 0.40644}, {"lat": 0.67251, "lng": 0.38866}, {"lat": 0.66813, "lng": 0.37198}, {"lat": 0.66686, "lng": 0.35479}, {"lat": 0.66786, "lng": 0.33278}, {"lat": 0.67282, "lng": 0.31669}, {"lat": 0.68489, "lng": 0.30155}]]
```

Display Nodes on Map






Future Research

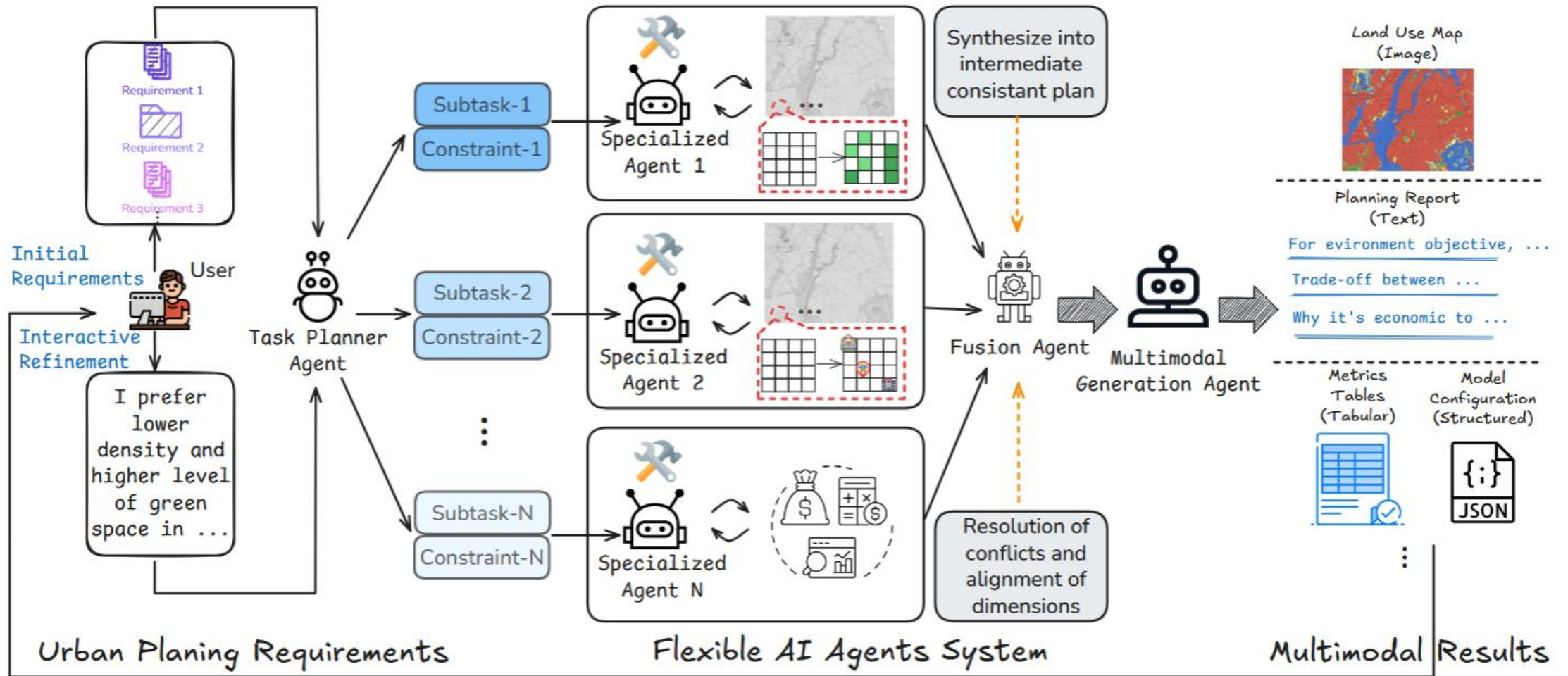
- Inclusion of more urban data in dataset
- Neighborhood labeling
 - Would allow for natural language prompts
- AI agents for chain-of-thought process

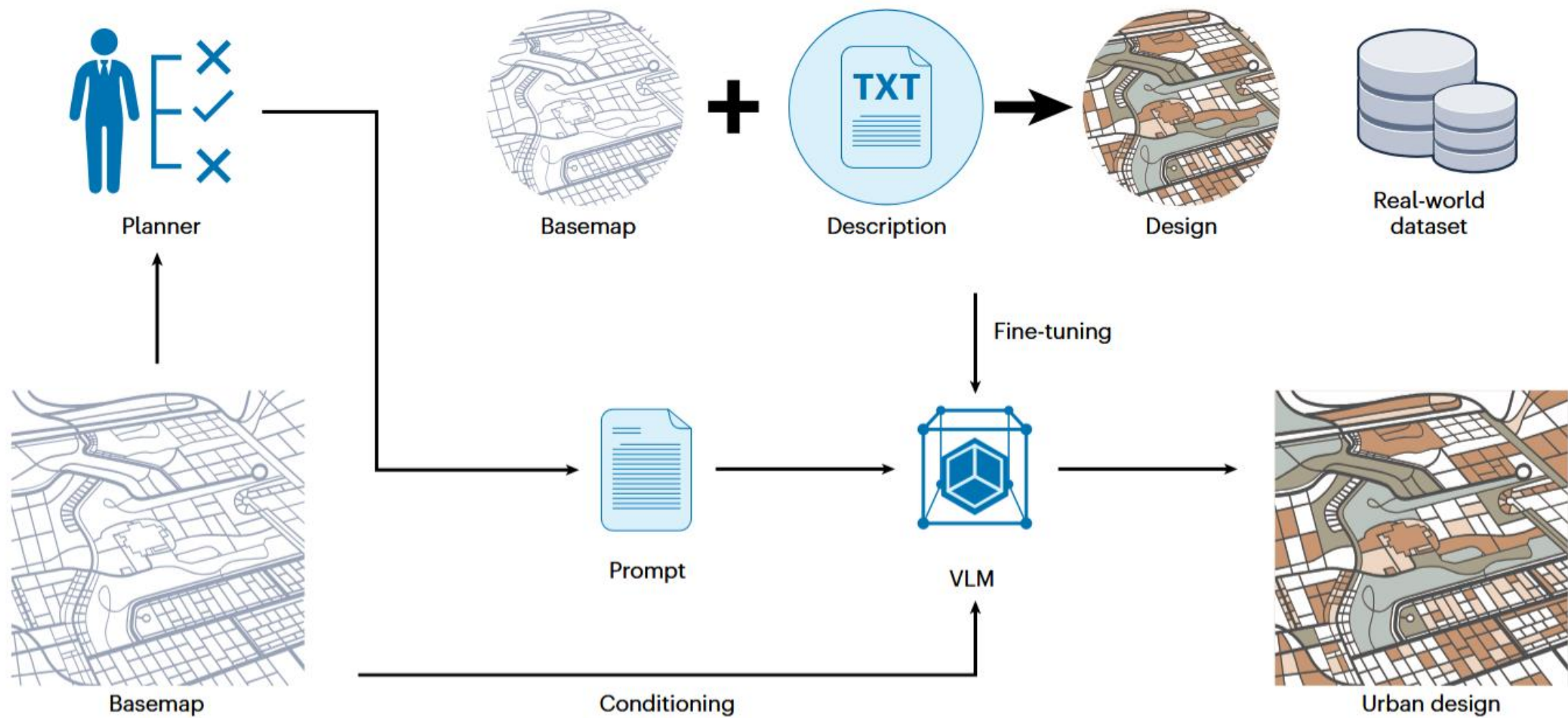


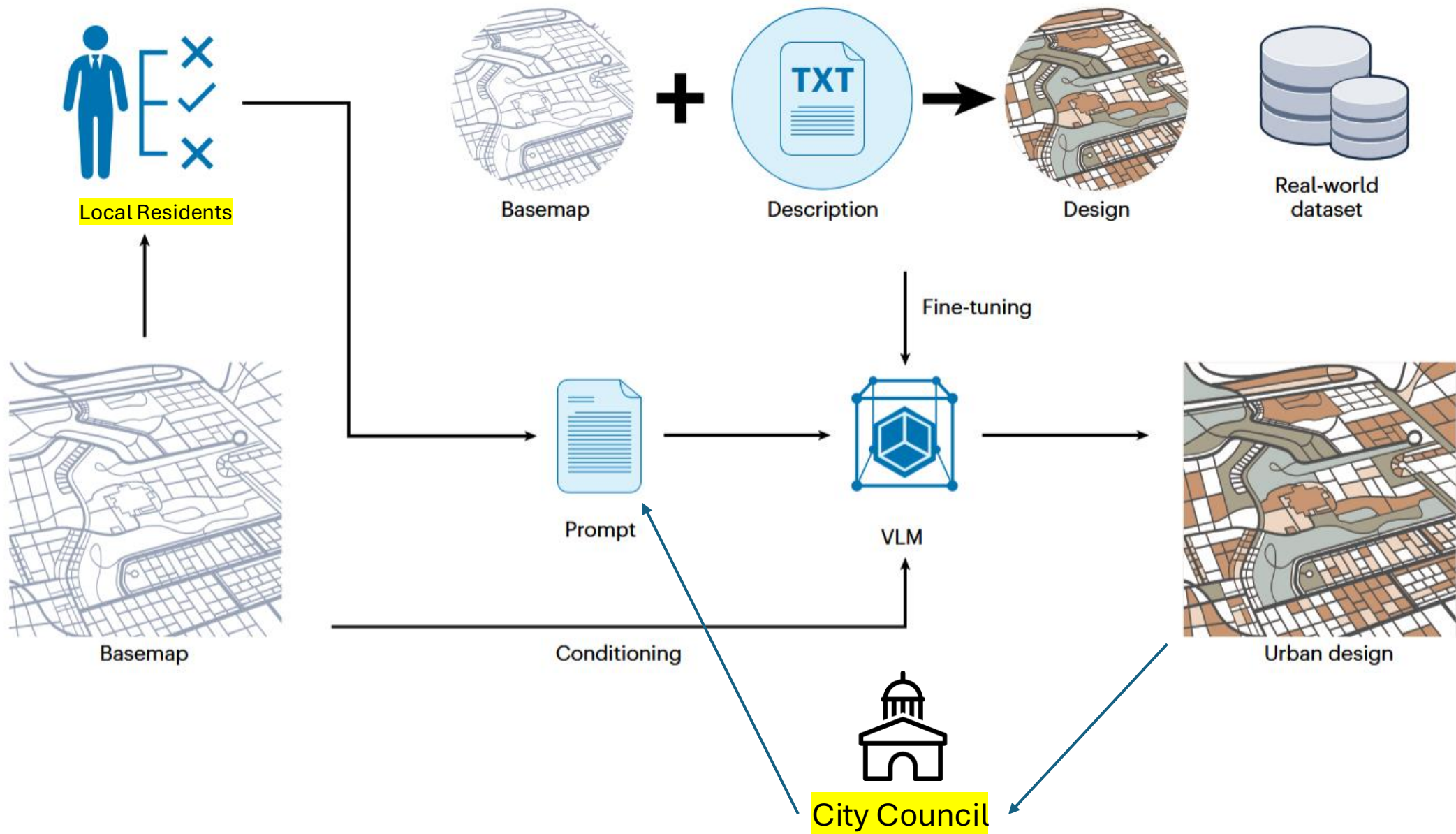
What can I help with?

Build me a new proposal for a park surrounded by local shops

+  Tools







South Bellevue  2 

Bellevue Downtown
Apr 27, 2024 2:31:28 PM

 **SOUNDTRANSIT**

 Link

South Bellevue 

2168

Questions?

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Link to repo:

